PITE 3921 Battery Monitoring System
User Manual

P-140606-V1.0

4/F, Bldg A, Chiwan Industrial Park, Shaodi Rd.,
Chiwan, Shekou Area, Shenzhen, China
TEL: +86-755-2680 5759
FAX: +86-755-2688 0310
www.pitetech.com

Catalog

1. INTRODUCTION 3
1.1 Accessories 3
1.2 Safety Information 3
1.3 Operating Precautions 4
2. OVERVIEW 4
2.1 About PITE 3921 4
2.2 Features 4
2.3 Specification 5
3. Operation 5
3.1 Wire Connection 5
3.1.1 DAC Connection 5
3.1.2 Control Unit Connection 7
3.1.3 Installation of Router 9
3.2 Operation on PC 10
3.2.1 Installation of SQL 10
3.2.2 Installation of Demo Software 10
3.2.3 Configuration of IIS 10
3.2.4 Operation of Demo Software 16
4. CONTACT PITE 22

1. INTRODUCTION

This Users Manual gives full information on how to use PITE 3921 Battery Monitoring System safely and effectively. It is applicable to all PITE 3921 models. Please read the manual carefully so as to obtain maximum performance of the monitor and its accessories.

Warning: Read this manual completely before connecting and powering on the monitor to avoid possible damage caused by improper use of this instrument.

1.1 Accessories

After receiving the PITE 3921 unit, please ensure that no damage occurred during transportation. Upon any damage or failure of operation based on this instrument, please contact your supplier immediately. And make sure you have each items below:

- PITE 3921 control unit (1)
- Testing lead for control unit (1 set)
- Data Acquisition Case (DAC) *
- Data Acquisition Leads *
- USB drive (1)
- Users Manual (1)

NOTE:

Amount of Accessories marked with "*" may vary each time based on different PITE 3921 models. Please check the packing list for details.

DAC (Data Acquisition Case)	Control unit	DAC lead
User Manual	Testing lead for control unit (Including CT)	USB drive

1.2 Safety Information

When you read this user manual, please carefully observe all warnings, precautions and instructions for effective operation of PITE 3921.

WARNING: Servicing described in this manual is to be done only by qualified personnel. To avoid electrical shock, do not service the instrument unless you are qualified enough under PITE's instruction.

⚠**DANGER**	Safety testing has been done on this instrument thoroughly before shipment. However, mishandling during use could result in injury or other bad consequences, as well as damage to the instrument. Make sure that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulted directly from instrument defects.

Safety Symbols

Description of symbols used in this manual.

⚠**WARNING**	Indicates correct operation to prevent a significant hazard that could result in serious injury or other bad consequences to users or the product.
NOTE	Indicates advisory items related to performance or correct operation of the instrument.

1.3 Operating Precautions

WARNING:

- The electrical voltage and current used in battery testing is potentially lethal.
- Ensure that any battery under test is disconnected before attempting any cleaning or maintenance of PITE 3921.
- Connection and disconnection procedures are extremely important. Be sure to follow the instructions faithfully.
- Do not touch conducting parts of the testing lead when they are connected to PITE 3921 and battery system.
- Explosion risk when using PITE 3921 (all models)
- When a lead acid battery is charged or discharged i.e. when there is a current flow through the battery it is always a risk that the battery can explode.
- For new open (vented) batteries the risk is medium to low but in old VRLA (sealed) batteries the risk is medium to high.
- If there is a bad connection inside the battery and there is a current flow - the connection will burn off and there will be an arc, which will ignite the oxyhydrogen gas in the battery.
- If you see any spark from batteries, testing cables or PITE 3921 main body, please switch off the unit and disconnect all cables for further inspection.
- Except as explained in this manual, do not attempt to service this equipment yourself.
- Before use, check to see if the nominal voltage ranges on the PITE 3921 matches the batteries that you are going to monitor. Do not apply PITE 3921 of lower voltage in higher voltage. For example, if PITE 3921 nominal voltage is 48V, do not connect the unit with batteries of 220V. Otherwise, some parts inside PITE 3921 main body may get damaged.
- Do not operate the PITE 3921 around explosive gas or vapor.
- Use only insulated measurement leads supplied with the monitor.
- Before use, please inspect the control unit, data logger and other accessories for mechanical damage and replace them once they are damaged. Pay special attention to the insulation surrounding the connectors.
- Remove all clamps, test leads and accessories that are not in use.

2. OVERVIEW

2.1 About PITE 3921

PITE 3921 is a series of state-of-art Battery Monitoring Systems that adopts advanced multi-frequency measurement technology and it has different way for communication. This patented and field proven system is able to monitor battery voltage, internal resistance, current, temperature and thus estimate the battery state of charge (SOC) and/or state of health (SOH). It is essential for critical UPS system and protection application.

2.2 Features

- Continuous 24/7 on-line monitoring for battery system integrity assurance
- Adopts multi-frequency measurement technology for battery measurement, more accurate and reliable.
- Unique communication technology of carrier wave (optional between control unit and DAC). It greatly simplifies the wire connection and makes it much easier to use.
- All systems consist of only 3 main parts: Data Acquisition Case (DAC), control unit and Client

software installed in sever or simply a tablet/smart phone.

- Modular design makes it very simple to install onsite and easily expandable to add more battery systems.
- Each DAC connects with 4 batteries with easy wire connection, very economical to use
- Advanced data processing technology, accurately analyze the battery state of charge (SOC) and state of health (SOH).
- Control unit has different ways of communication like RS485, wifi and Ethernet. You could optionally transfer data to smart phone onsite or internet remotely.
- Complete data monitoring for voltage, current, resistance, temperature with early warning for weak batteries. Effectively shorten the time for battery routine discharge to know real battery capacity.
- This system is compatible with PITE's series battery monitor during battery discharge. Complete solutions for battery system to ensure its performance.
- Very competitive price against its peers. Now, it is very economical to add this significant "safeguard" to your critical system.

2.3 Specification

Item	Measurement range	Accuracy
Cell voltage	0~16V	0.2%rgd+6dgt
Cell resistance	0~10mΩ	2%rgd+6dgt
Charge/discharge current	0~1000A (with optional CT)	1%rgd+6dgt
Temperature	0~100℃	0.5℃
String voltage	0~260V (or customized)	0.2%rgd+6dgt
Working environment	0~50℃, ≤90%RH	
Standard	CE marking	

3. Operation

3.1 Wire Connection

3.1.1 DAC Connection

Each DAC has two serial ports, one male and the other female as picture below. They are respectively connected with two connectors, one for power supply and one for measurement of each battery.

Fig 3.1.1.1

Fig 3.1.1.2 Connector for power supply

Fig 3.1.1.3 Connector for measurement

Each DAC is connected with 4 cells. They are programmed to monitor one of these battery types: 1.2V, 2V and 12V. That is to say, if it is programmed to measure 2V cells, it could not be used to measure 12V cells, and vice versa. Below is the detailed wire connection of the DAC with batteries.

DAC connection with battery string:

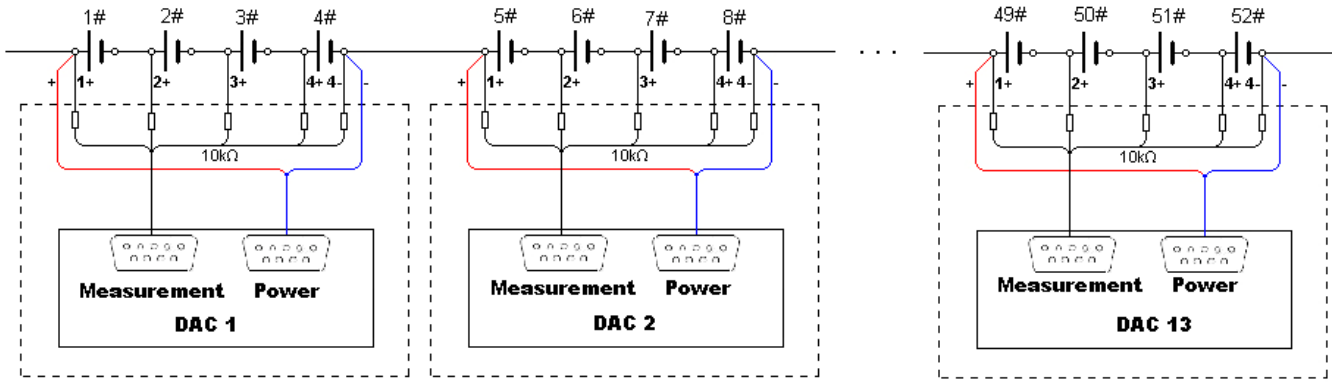


Fig 3.1.1.4

Wire connection of the last DAC in string:

When the remaining battery amount is less than 4, the wire connection of the last DAC will be a little different. There will be different way of connection depending on how many cells are left.

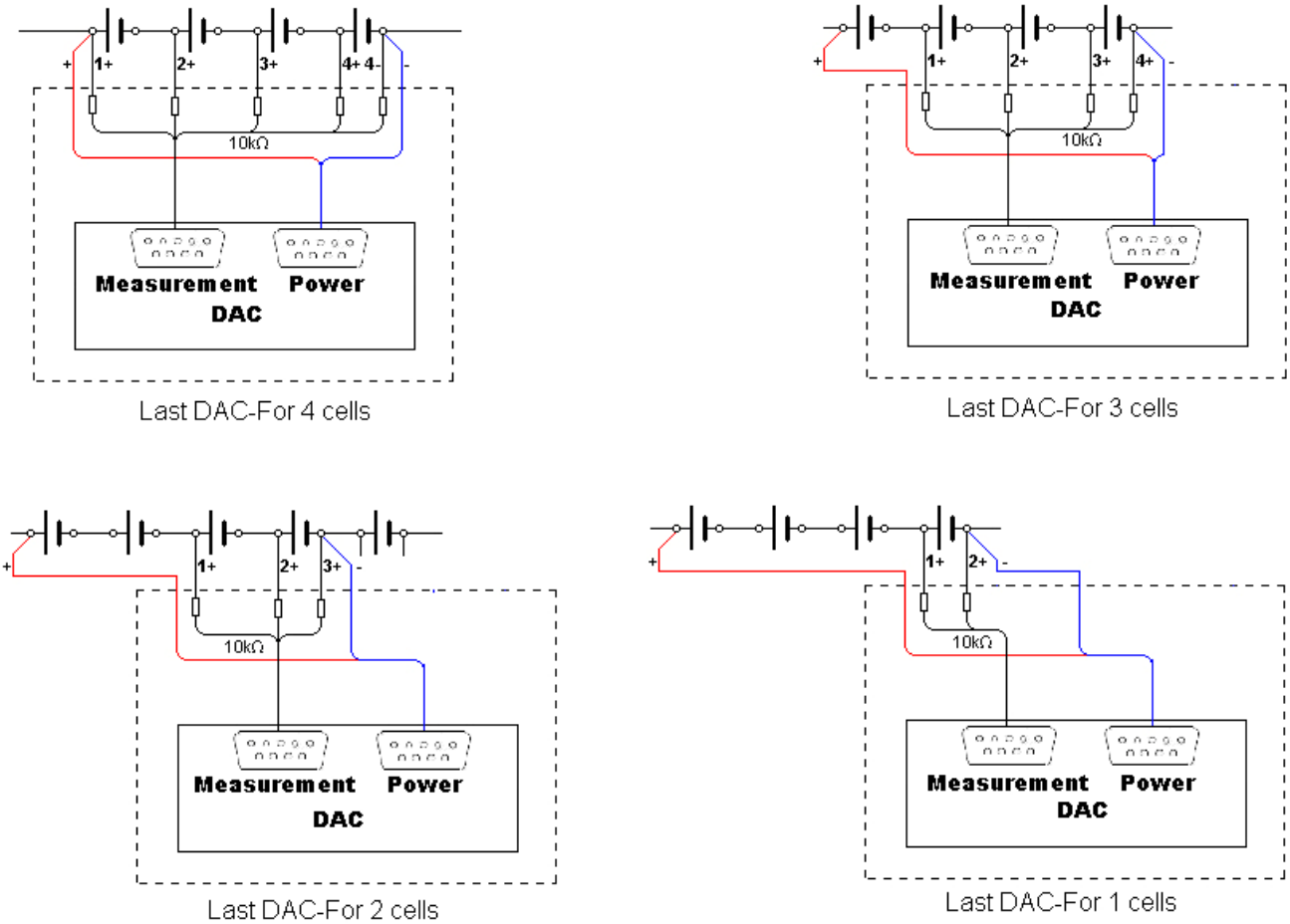


Fig 3.1.1.5

NOTE:

1) For power supply of DAC, it is designed to fit different type of batteries that are under measurement. If the monitored batteries are of 2V, the power supply is 8V (4 cells). If the cell type is 12V, the power supply is 48V (4 cells). To avoid damage of DAC due to over voltage, please connect them properly with the battery string.
2) For security reason in the initial installation, please firstly connect the DAC leads with DAC before connecting the lads with battery string.

3.1.2 Control Unit Connection

The control unit is composed of two parts: control unit main body and measurement lead as the pictures below.

Fig 3.1.2.1 Measurement Lead

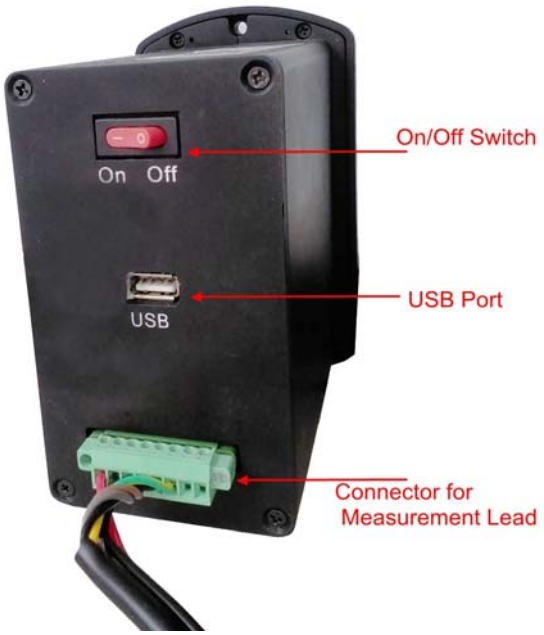


Fig 3.1.2.2 Control Unit

Connection of Control unit with Battery String:

1) Power supply

Control unit is powered by batteries via the two measurement leads. The red measurement lead is connected with connected with positive post of the battery string, while the black lead is connected with negative of string.

NOTE:

Both low volt and high volt power supply will not make it work. There is high voltage protection model built in the case. For different battery string, the measurement lead has different tolerance of voltage. It is generally 20% higher than string nominal voltage. For example, if string voltage is 48V, tolerance voltage is around 57.6V.

For security reason, please do not attempt to connect voltage testing lead with strings that are higher than this level.

2) Voltage Measurement

The measurement leads has two functions, power supply and string voltage measurement. After the above wire connection, the control unit will collect measurement result of voltage from battery string.

3) Current testing

Current sensor is customer-tailored to fit different battery systems. It could be connected with any battery connecting strap/bar between cells. If size of connecting bars are too big to connect current sensor, you could connect it with outlet or inlet busbar of the battery string like the picture below:

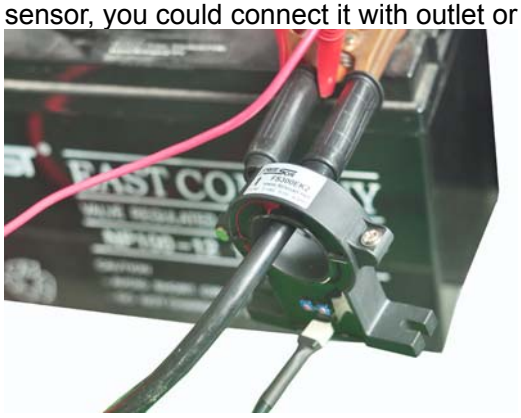


Fig 3.1.2.3

3.1.3 Installation of Router

Router is used for data transmission from the control unit to the server.
In this user manual, we use PC that has wireless LAN as demo. This PC will play the role like a server. Position of router is as the system diagram below.

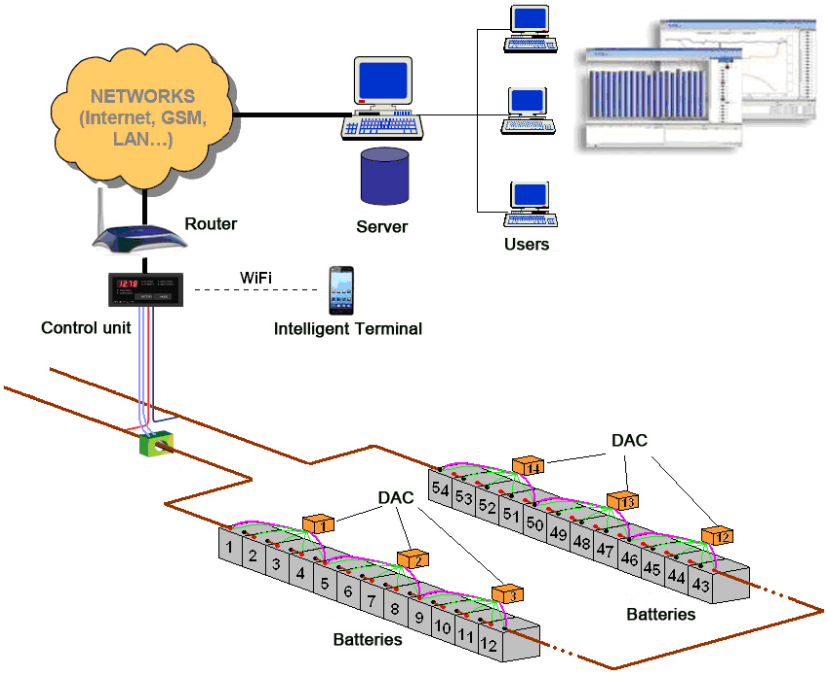


Fig 3.1.3.1 System diagram

All control unit of PITE 3921 has been set as working mode of “Client”. The defaulted SSID number is “plukeserver” while the password is 12345678.

In this illustration, we are using a wireless mini router like the picture below as example.

Fig 3.1.3.1 Wireless router

For installation of router, please do as these steps:

1) After the control unit is well connected with the battery system, please turn on the On/Off switch.
2) Connect the router with power supply.
3) Turn on the wireless network of you PC and select your router wireless connection.
4) Config the router as and set its working mode as “AP” and change its SSID name “plukeserver” which is same as that of control unit.
5) The wireless selection will be changed to “plukeserver” once the above setting is done. And configuration of router is finished.

3.2 Operation on PC

3.2.1 Installation of SQL

To use PITE 3921 demo software in PC, you are suggested to install SQL server software of 2000 in your PC. For its installation instruction, please refer to Windows's website for guidance.

3.2.2 Installation of Demo Software

Open the demo software from PITE and double click the file named "On-lineStorageBatteryMonitoringSystem_Communication(V3_148).exe" to start installation.
You will then see the screen as below. The installation includes two parts: database and WEB. Please first input user name and password to install database. The user name and password was customized during installation of SQL server software.

After it is finished, install WEB.

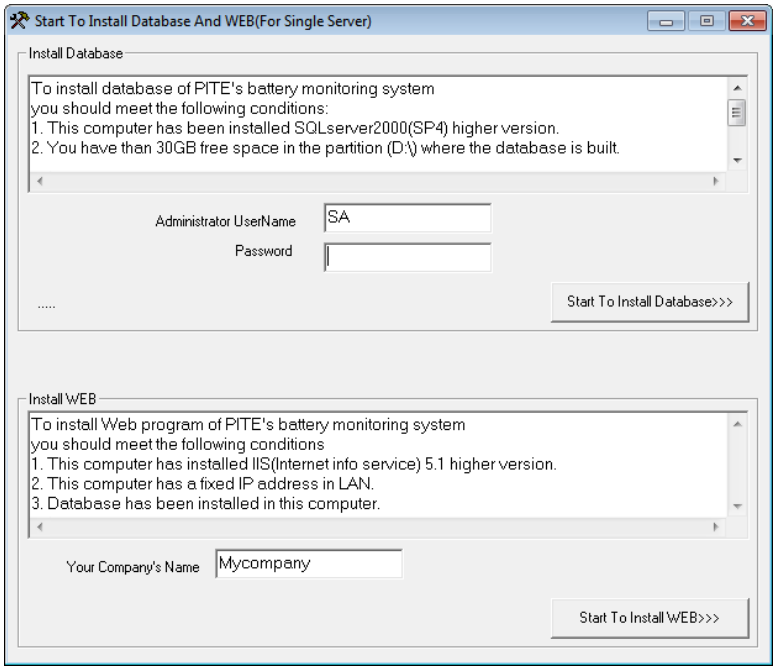

Start To Install Database And WEB(For Single Server)
Install Database
To install database of PITE's battery monitoring system
you should meet the following conditions:
1. This computer has been installed SQLserver2000(SP4) higher version.
2. You have than 30GB free space in the partition (D:\) where the database is built.
Administrator UserName
SA
Password
.....
Start To Install Database>>>
Install WEB
To install Web program of PITE's battery monitoring system
you should meet the following conditions
1. This computer has installed IIS(Internet info service) 5.1 higher version.
2. This computer has a fixed IP address in LAN.
3. Database has been installed in this computer.
Your Company's Name
Mycompany
Start To Install WEB>>>

Fig 3.2.2

3.2.3 Configuration of IIS

Before using the demo software, please make the configuration of IIS in your PC. In this user manual, the configuration is done in PC with operation system of Windows 7 Ultimate.

Steps of configuration:
First, go to Control Panel and view it as "All Control Panel Items" as below:

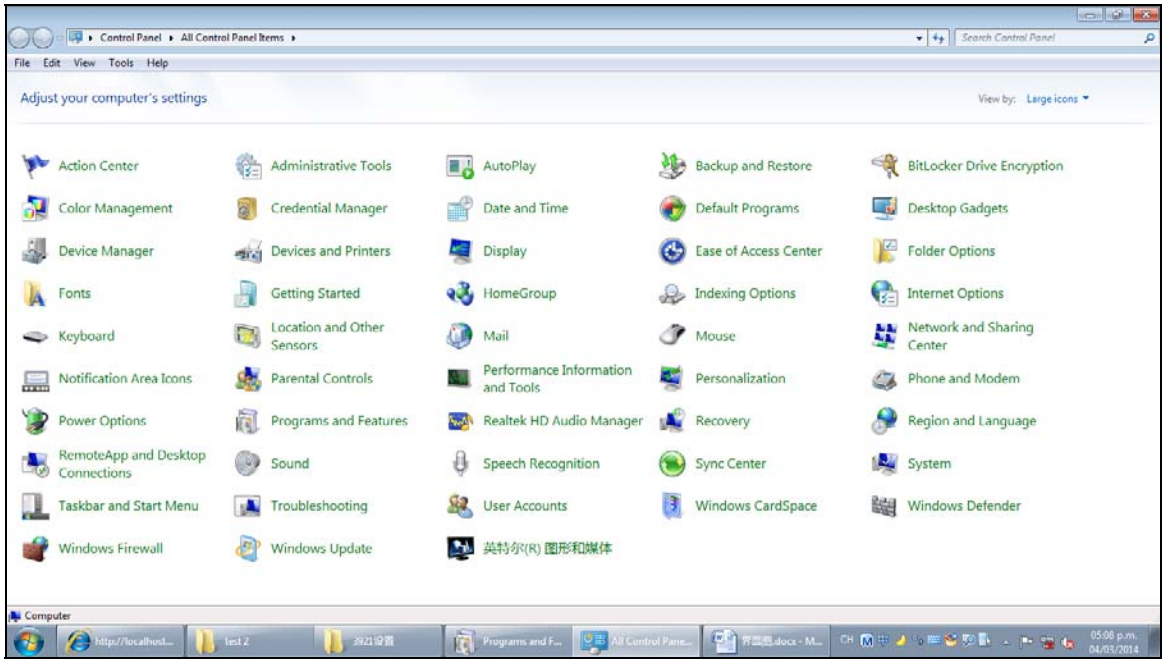


Fig 3.2.3.1

Select “Program and Features”:

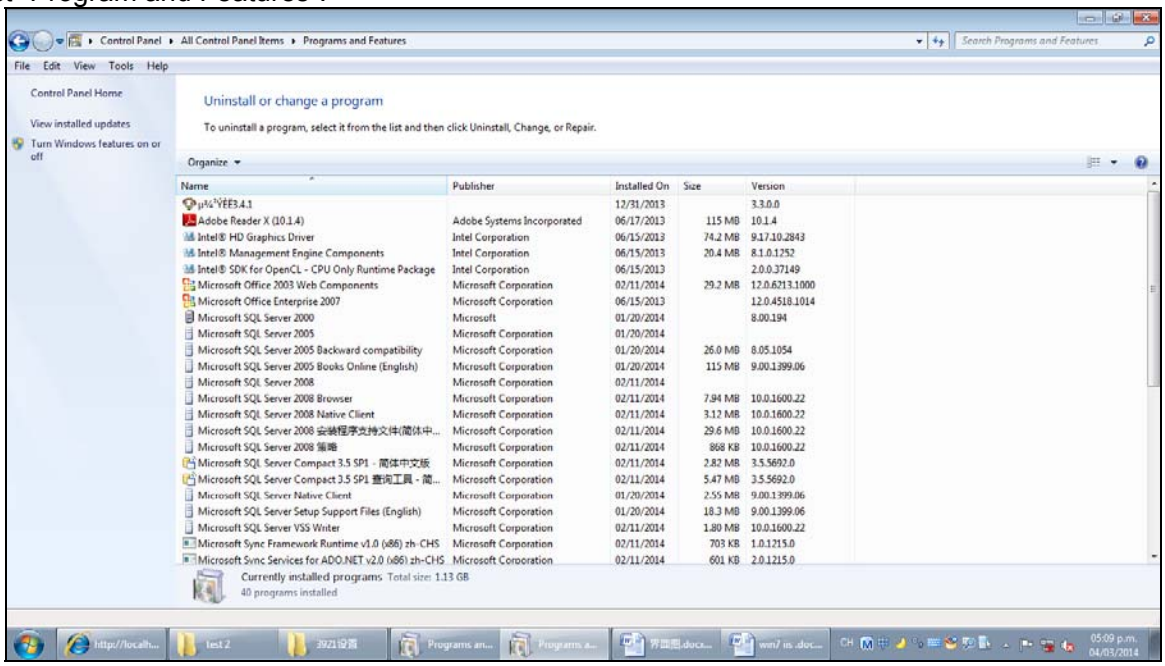

Control Panel ▸ All Control Panel Items ▸ Programs and Features
Search Programs and Features
File Edit View Tools Help
Control Panel Home
View installed updates
Turn Windows features on or off
Uninstall or change a program
To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.
Organize
Name
Publisher
Installed On
Size
Version
Adobe Reader X (10.1.4)
Adobe Systems Incorporated
Intel® HD Graphics Driver
Intel Corporation
Intel® Management Engine Components
Intel Corporation
Intel® SDK for OpenCL - CPU Only Runtime Package
Intel Corporation
Microsoft Office 2003 Web Components
Microsoft Corporation
Microsoft Office Enterprise 2007
Microsoft Corporation
Microsoft SQL Server 2000
Microsoft
Microsoft SQL Server 2005
Microsoft Corporation
Microsoft SQL Server 2005 Backward compatibility
Microsoft Corporation
Microsoft SQL Server 2005 Books Online (English)
Microsoft Corporation
Microsoft SQL Server 2008
Microsoft Corporation
Microsoft SQL Server 2008 Browser
Microsoft Corporation
Microsoft SQL Server 2008 Native Client
Microsoft Corporation
Microsoft SQL Server 2008 Setup Support Files (English)
Microsoft Corporation
Microsoft SQL Server Native Client
Microsoft Corporation
Microsoft SQL Server Setup Support Files (English)
Microsoft Corporation
Microsoft SQL Server VSS Writer
Microsoft Corporation
Microsoft Sync Framework Runtime v1.0 (x86) zh-CHS
Microsoft Corporation
Microsoft Sync Services for ADO.NET v2.0 (x86) zh-CHS
Microsoft Corporation
Currently installed programs Total size: 1.13 GB
40 programs installed

Fig 3.2.3.2

Click “Turn Windows features on or off” on the left column and you will see the screen like below:

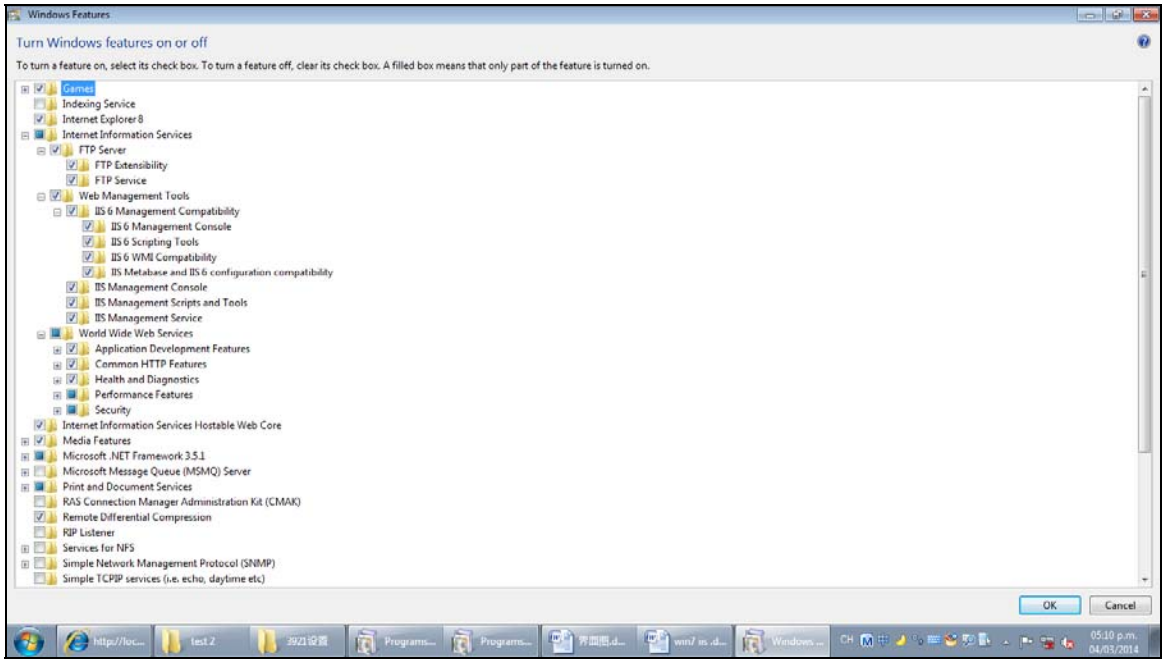

Windows Features
Turn Windows features on or off
To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on.
Games
Indexing Service
Internet Explorer 8
Internet Information Services
FTP Server
FTP Extensibility
FTP Service
Web Management Tools
IIS 6 Management Compatibility
IIS 6 Management Console
IIS 6 Scripting Tools
IIS 6 WMI Compatibility
IIS Metabase and IIS 6 configuration compatibility
IIS Management Console
IIS Management Scripts and Tools
IIS Management Service
World Wide Web Services
Application Development Features
Common HTTP Features
Health and Diagnostics
Performance Features
Security
Internet Information Services Hostable Web Core
Media Features
Microsoft .NET Framework 3.5.1
Microsoft Message Queue (MSMQ) Server
Print and Document Services
RAS Connection Manager Administration Kit (CMAK)
Remote Differential Compression
RIP Listener
Services for NFS
Simple Network Management Protocol (SNMP)
Simple TCPIP services (i.e. echo, daytime etc)
OK
Cancel

Fig 3.2.3.3

Select all items (click all items to expand) under “Internet Information Services” and click “OK” to save the change.

Then, right click “Computer” on desktop and select “Manage” as below:

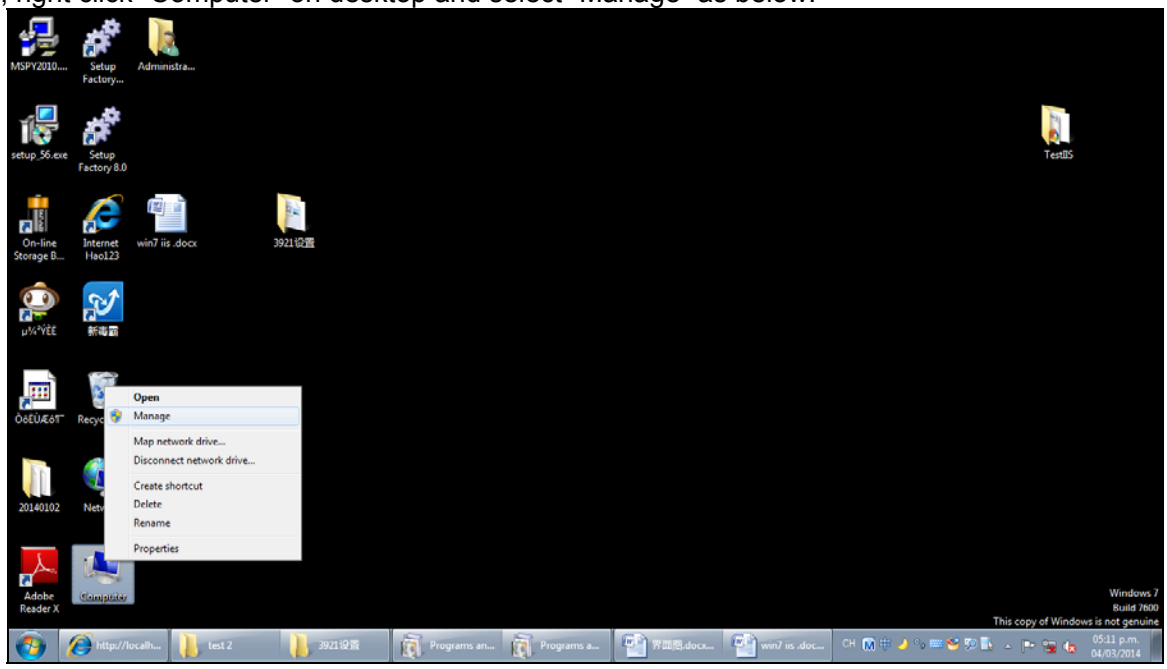


Fig 3.2.3.4

Click “Service and Application” to expand and select “Internet Information Service” as below:

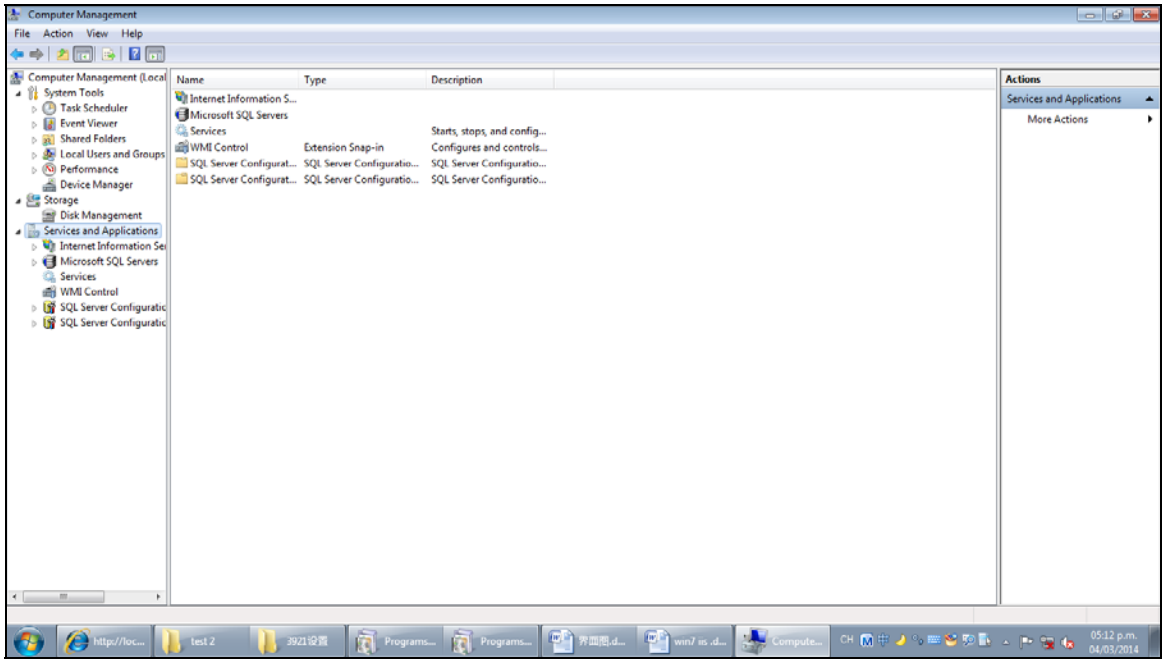


Fig 3.2.3.5

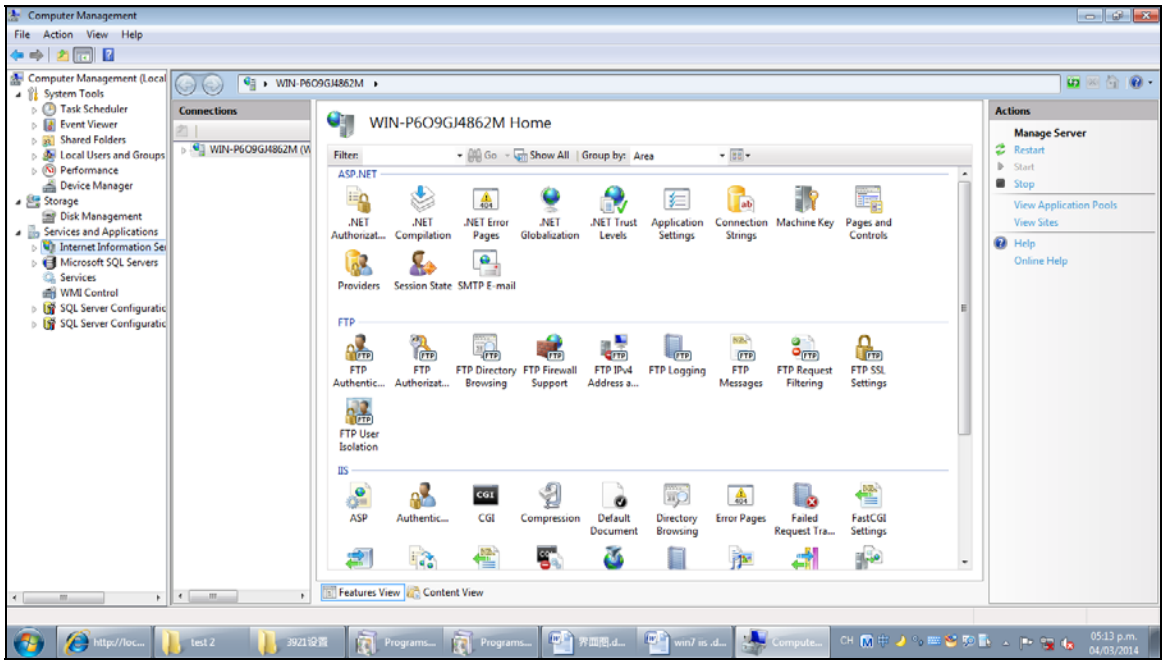


Fig 3.2.3.6

Double click “ASP” under “IIS”, you will see the screen below. Set “Enable parent paths” as “True”:

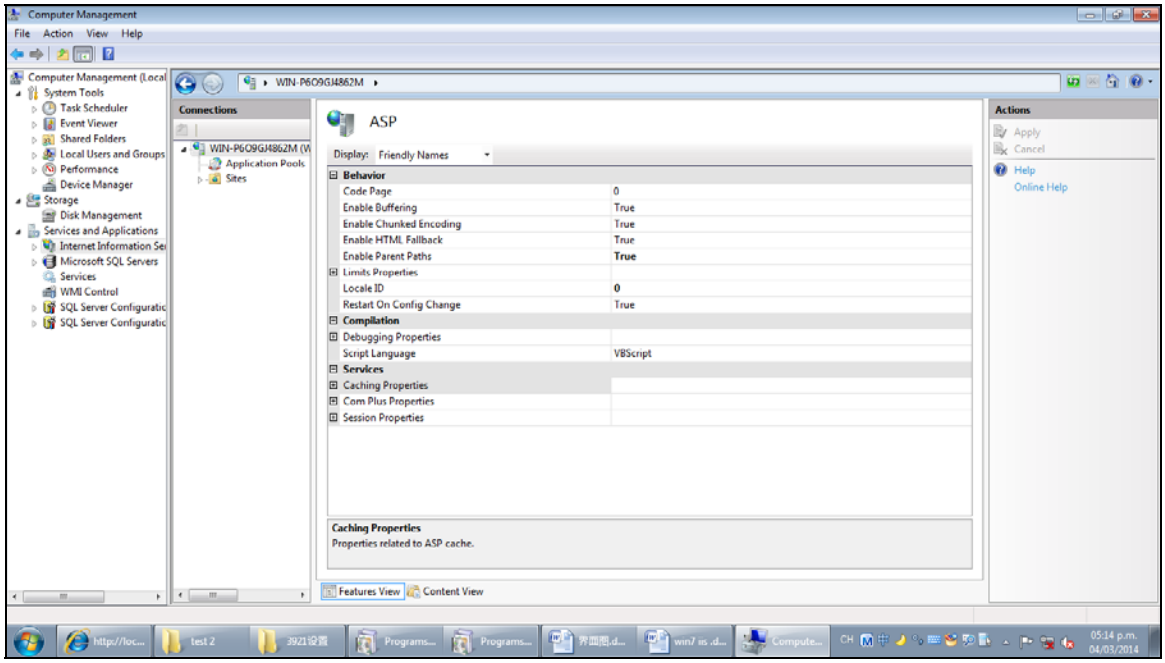


Fig 3.2.3.7

Then click “Sites” in the middle column, you will see the screen as below. Click “Yes” to continue:

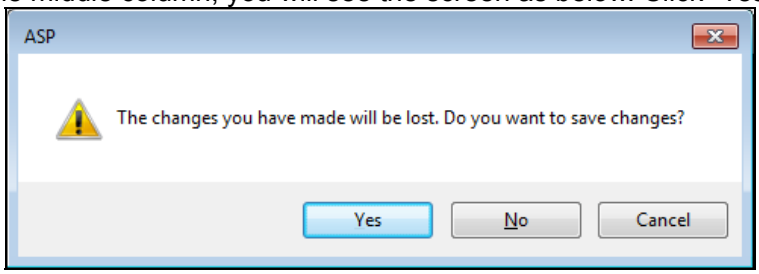


Fig 3.2.3.8

Select “Default Web Site” under “Sites” in the middle column and then click “Advanced Settings” in the right column. You will see the screen like Fig 3.2.3.10.

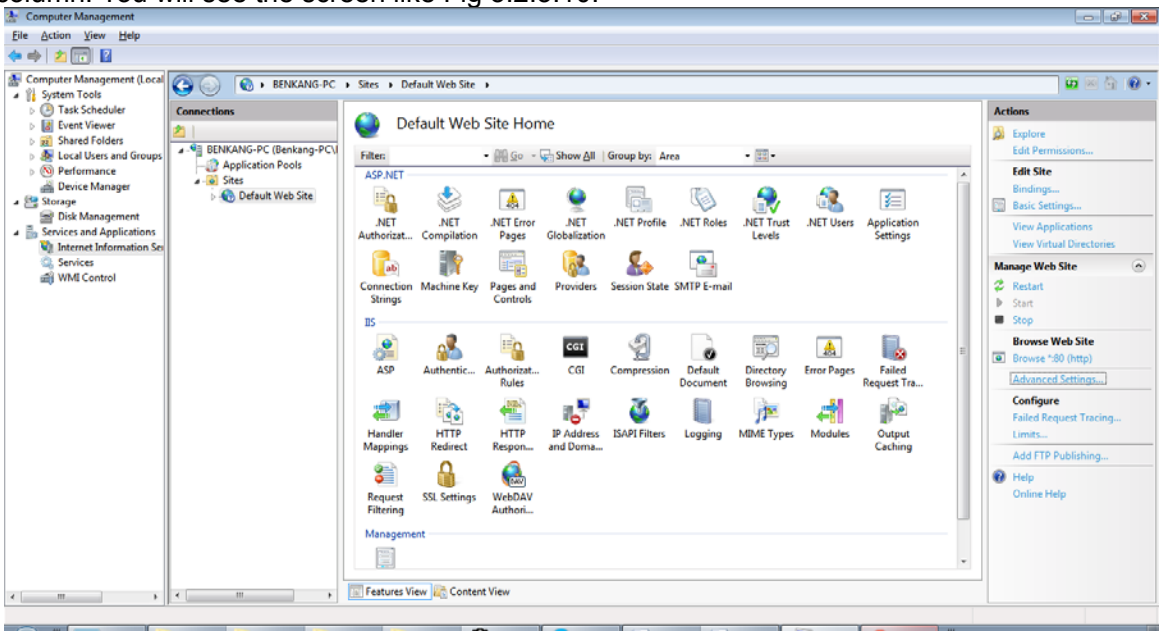


Fig 3.2.3.9

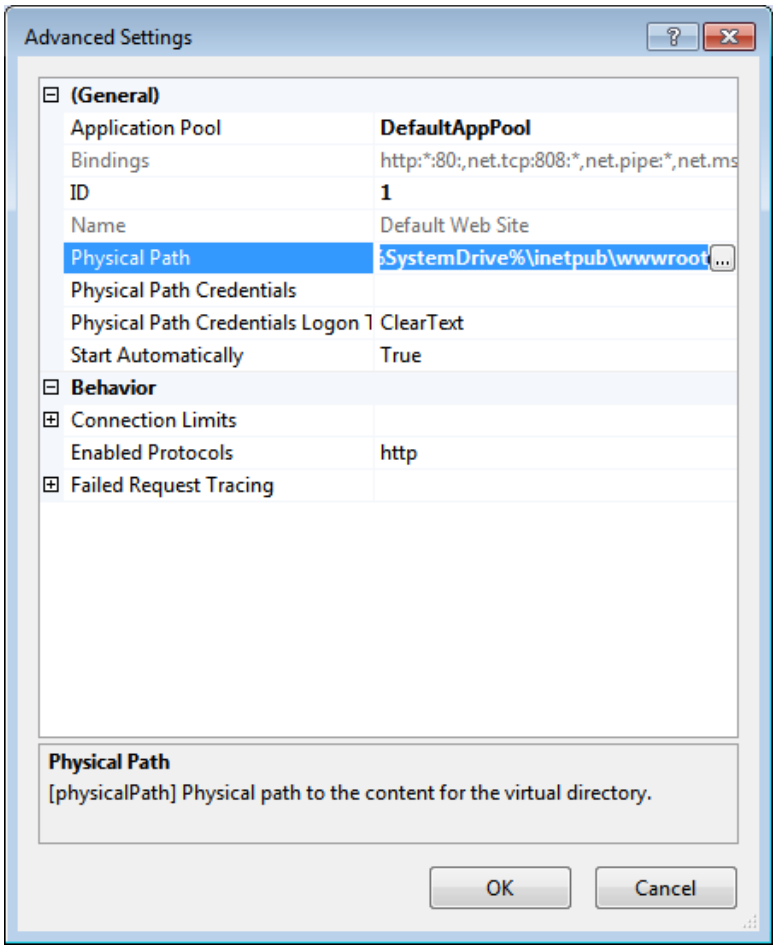


Fig 3.2.3.10

In the item “Physical Path”, please input the path of folder named “BTSWEB” under installation path of “On-line Storage Battery Monitoring System” software. For example, “C:\Program Files (x86)\On-lineStorageBatteryMonitoringSystem\BTSWEB”. To find this folder path, you could right click the icon of “On-line Storage Battery Monitoring System” on PC desktop, select “Properties”, select “Shortcut” and click “Open File Location”.

After the setting of physical path, click “OK” to save the change.

Then in the same screen (Fig 3.2.3.9), click “Binding” on the right column as the screen below. You will see the screen like Fig 3.2.3.12

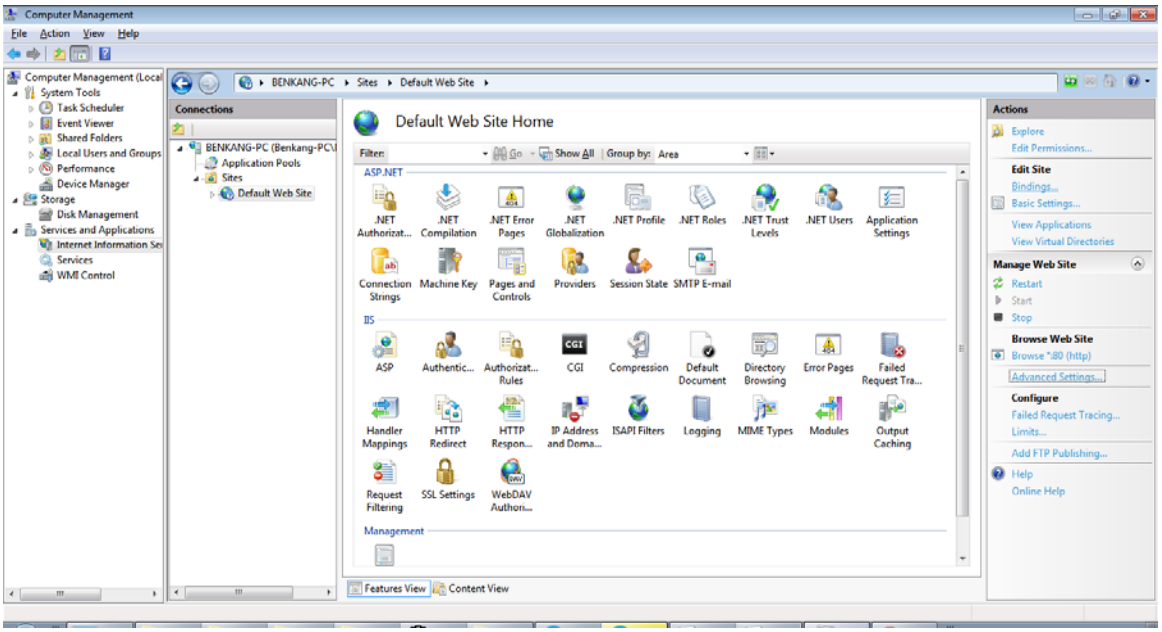


Fig 3.2.3.11

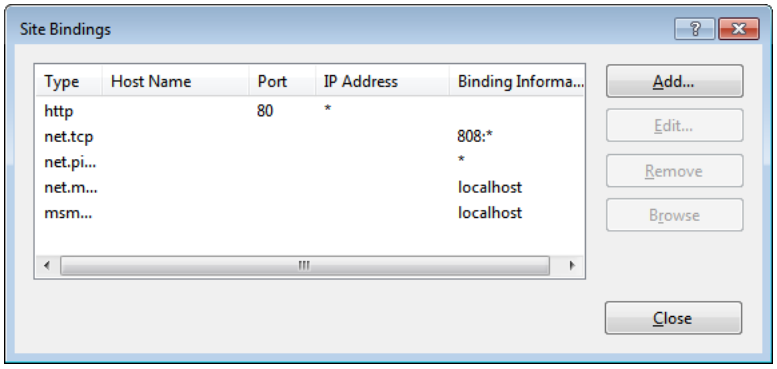


Fig 3.2.3.12

Click the button “Add” and put your computer IP address and Port like example below. And click “OK” to save the change.
Host name is customized.

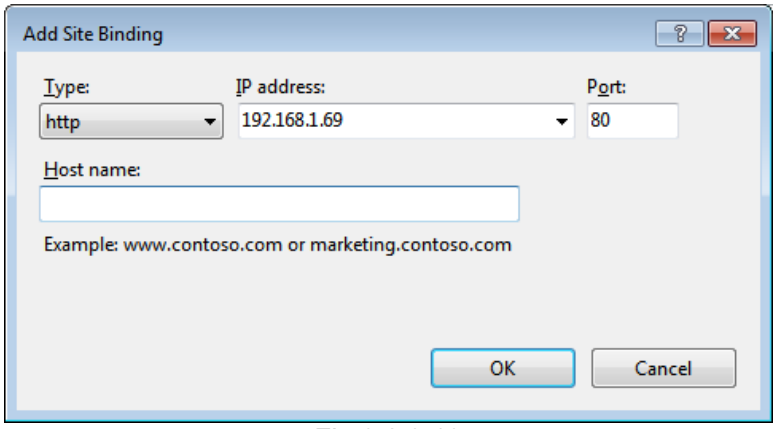


Fig 3.2.3.13

And now configuration of IIS is finished. You could log in the browser to view the monitoring data. For more detailed information, please refer to the chapter below.

3.2.4 Operation of Demo Software

After successful installation of demo software and configuration of IIS, now you could log in the website

for demonstration of PITE 3921 Battery Monitoring System. Please use IE browser and input your PC IP address. You will see the screen like Fig 3.2.4.1. And log in with the user name and password. Default user name is admin while password is 123. After successful login, you will be connecting to the SQL software.

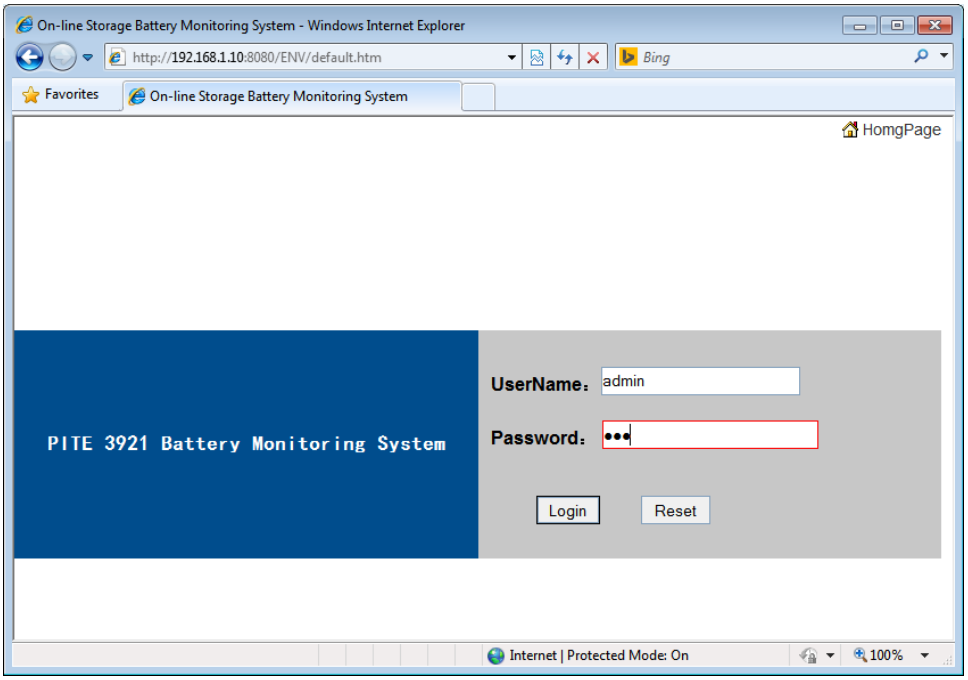


Fig 3.2.4.1

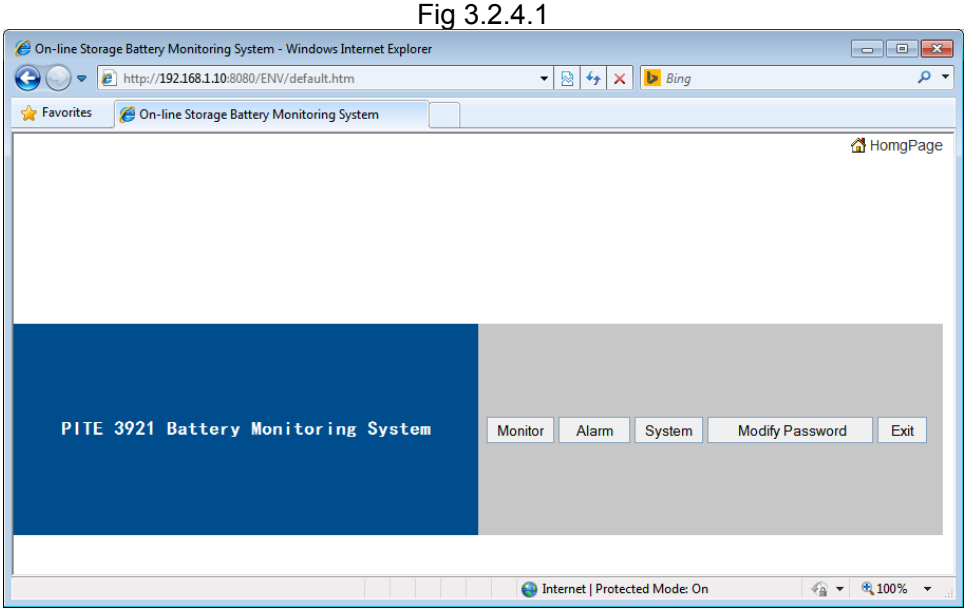


Fig 3.2.4.2

Go to “System” in Fig 3.2.4.2 and you could start adding battery and company information as screens below:

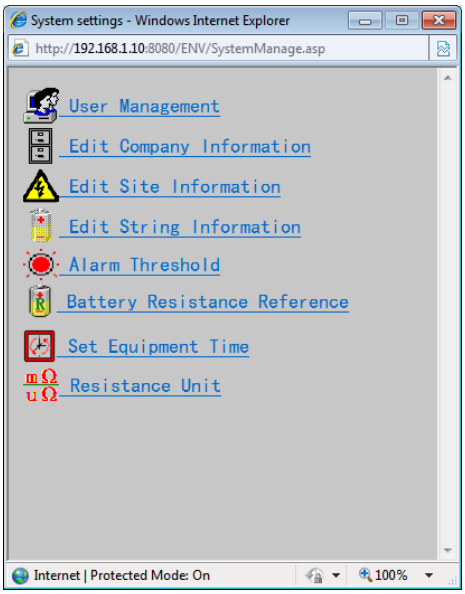
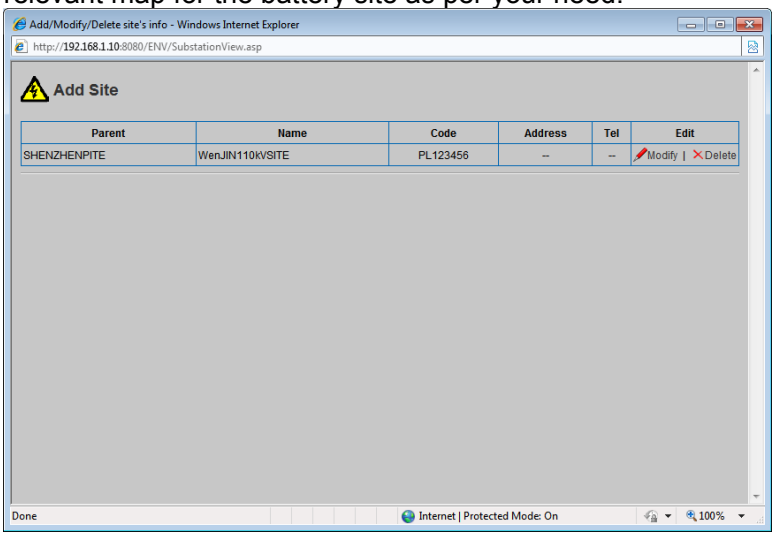


Fig 3.2.4.3

Now you could start monitoring the battery following these steps one by one:

1) **Edit site information:**

Click “Edit Site Information” to edit or add new site information as screen below. You could also add relevant map for the battery site as per your need.



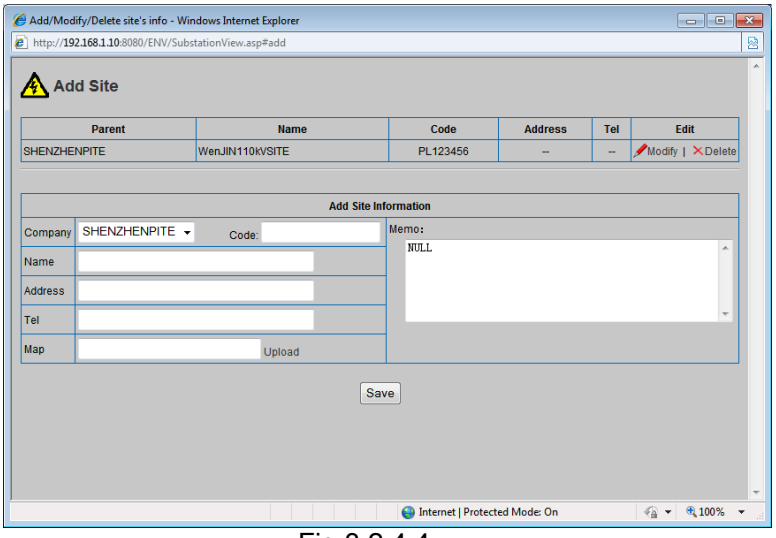
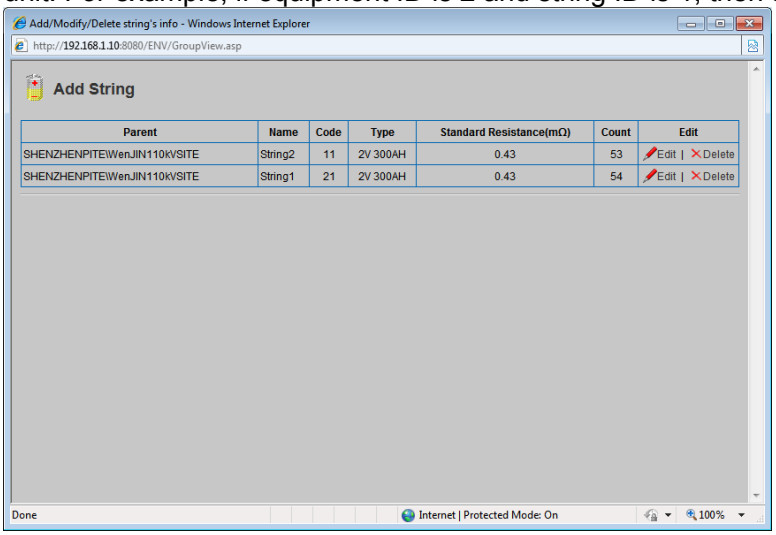


Fig 3.2.4.4

2) Edit String Information

After site information is built, please click “Edit String Information” to edit or add information for battery string as screen below.

NOTE: String code is composed of Equipment ID and String ID. Equipment indicates the control unit. For example, if equipment ID is 2 and string ID is 1, then string code should be 21.



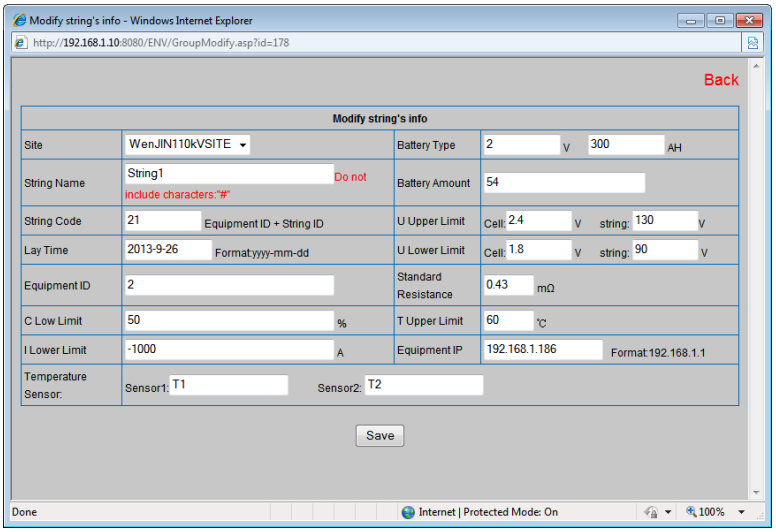


Fig 3.2.4.5

After the setting, click “Save” to continue.

3) Other setting in WEB if necessary

Se the alarm threshold, system time and resistance unit as per your need in the screen of Fig 3.2.4.3.

4) Run monitoring software

Double click the icon named “On-line Storage Battery Monitoring System” on your PC desktop to run the software. During the process of battery monitoring in IE browser, please keep this software running.

Open the software, you will see the screen as below:

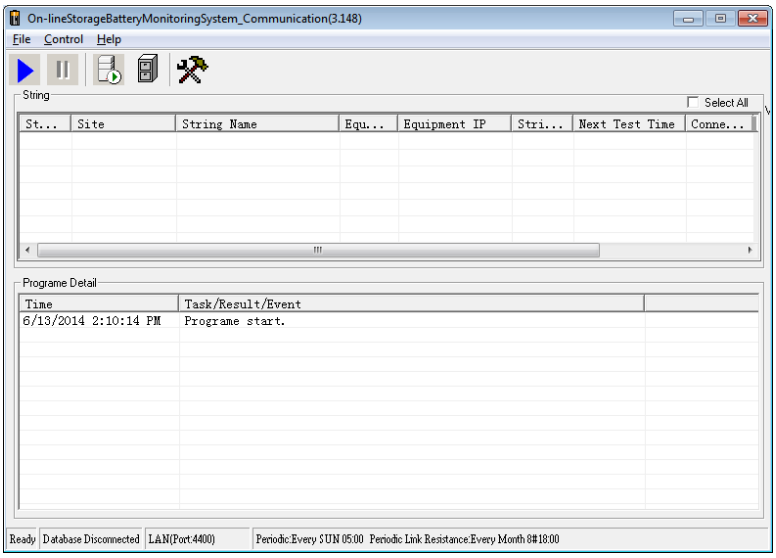

On-lineStorageBatteryMonitoringSystem_Communication(3.148)
File Control Help
String
Select All
St... Site String Name Equ... Equipment IP Stri... Next Test Time Conne...
Programe Detail
Time Task/Result/Event
6/13/2014 2:10:14 PM Programe start.
Ready Database Disconnected LAN(Port:4400) Periodic:Every SUN 05:00 Periodic Link Resistance:Every Month 8#18:00

Fig 3.2.4.6

Select “Control”—“Option”—“Connect Equipment”, select LAN, set port as 4400 and save the change.

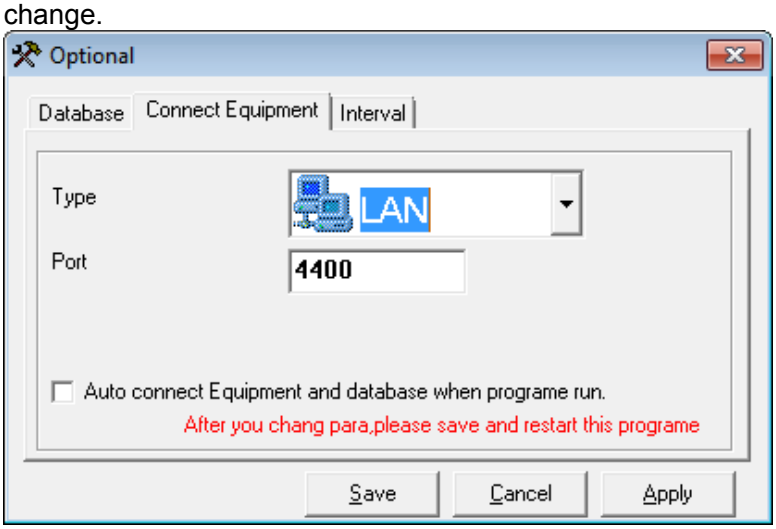


Fig 3.2.4.7

Go to the menu, select “File”—“Connect Database”—Select relevant string ID below—click “Connect Equip” under “File”. Select “Start Periodic Task” if necessary, in which the monitoring system will record the data periodically as per the setting.

You could also use the quick navigation icons in the screen for these operations.

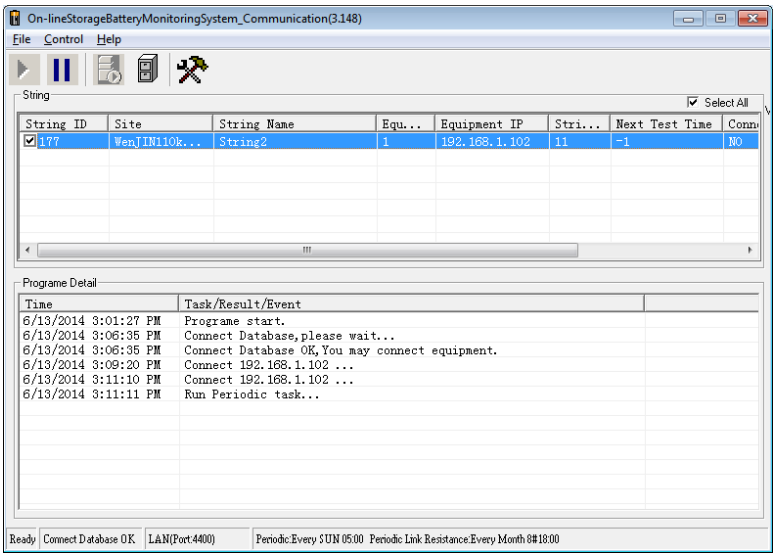

On-lineStorageBatteryMonitoringSystem_Communication(3.148)
File Control Help
String
Select All
String ID Site String Name Equ... Equipment IP Stri... Next Test Time Conn
177 WenJIN110k... String2 1 192.168.1.102 11 -1 NO
Programe Detail
Time Task/Result/Event
6/13/2014 3:01:27 PM Programe start.
6/13/2014 3:06:35 PM Connect Database,please wait...
6/13/2014 3:06:35 PM Connect Database OK,You may connect equipment.
6/13/2014 3:09:20 PM Connect 192.168.1.102 ...
6/13/2014 3:11:10 PM Connect 192.168.1.102 ...
6/13/2014 3:11:11 PM Run Periodic task...
Ready
Connect Database OK
LAN(Port:4400)
Periodic:Every SUN 05:00 Periodic Link Resistance:Every Month 8#18:00

Fig 3.2.4.8

5) View Monitoring Data

Keep the monitoring software running during this process. Then you could go to the browser and click the button “Monitor” in homepage to view the monitoring data.

Fig 3.2.4.9

You will see icons indicating different statuses of battery in the map. Click these icons, you will see the data in detail like the screen below:

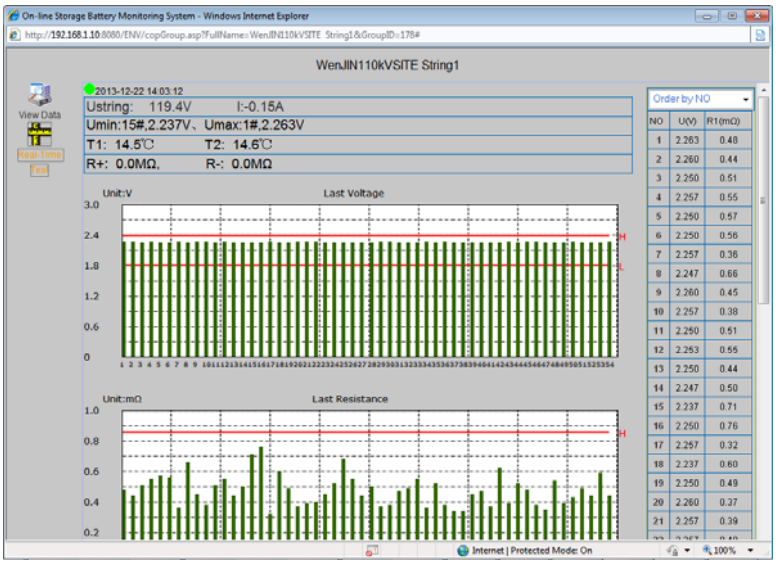


Fig 3.2.4.10

4. CONTACT PITE

PITE TECH. INC.
4/F, Bldg A, Chiwan Industrial Park, Shaodi Rd., Chiwan, Shekou Area, Shenzhen, China
TEL: +86-755-2680 5759 FAX: +86-755-2688 0310
sales@pitetech.com www.pitetech.com